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CONTRIBUTIONS TOWARD A MONOGRAPH OF THE MUTILLIDAE AND THEIR ALLIES OF AMERICA NORTH OF MEXICO

BY JAMES CHESTER BRADLEY

II. A REVISION OF *TIMULLA* *ASHMEAD*, A SUBGENUS OF *MUTILLA* EQUIVALENT TO THE SPECIES GROUP *HEXAGONA* OF FOX

Failure to apprehend certain excellent structural characteristics which in reality differentiate the males of our eastern species of this group, and consequent attempts to separate them by their color, has led to complete confusion. Five abundantly characterized, distinct species have been included under the names *hexagona*, *promethea* and *floridensis*. The character by which separation has heretofore been sought, especially of the two former, has been largely the degree of redness. Erythrization, the replacing of black with red, is a phenomenon commonly met with in Hymenoptera as we proceed from north to south in the eastern United States. Consequently, when the species are correctly separated, it is no surprise to find each of them varying to a greater or less extent from red to black. In the species *rufa*, as here defined, we find the majority of the northern specimens with black head and thorax, all of the southern ones, except one from northern Georgia, and some northern ones with head and thorax partially red; of *briaxus* I have specimens from Virginia and northward, all with black thorax, and one from Florida with red dorsum; of *hexagona* my series is smaller, but the only two entirely black ones come from Virginia; *promethea* is entirely confined to the far south, and all the specimens have the top of the head and the dorsum red; *floridensis* is confined to south Georgia and Florida, and has not only the dorsum but also the sides of the thorax red, except in one specimen from Georgia.

It would seem, from the evidence at hand, that the red forms are to be looked for not only in the distinctly Lower Austral Zone, but also in its northern coastal extension, while the black forms occur inland and perhaps far southward in the Carolinian Zone.

This is suggested by the fact that the only red specimens I have from the north came from along the coast, Ocean County, New Jersey, and Yaphank, Long Island, while Melander records them from Woods Holl, Mass. A series of twenty, representing three species, collected by Mr. Nathan Banks at Falls Church in the Piedmont region of Virginia are all black, and so is the only specimen that I have from Upper Austral Georgia, namely, from Austell, while all of my numerous specimens from Lower Austral localities, namely, Southern Pines, North Carolina; St. Simon Island, Okefenokee Swamp and Decatur County, Georgia, and various Florida localities are all red. The present evidence therefore suggests that black specimens of *hexagona*, *rufa* and *briaxus* are to be looked for in the Upper Austral region, except along the very coast, and red ones in the Lower Austral and strictly coastal regions of the Carolinian.

The following characters of the males, varying within the genus but showing no variation within the species, are of importance for specific diagnosis: shape and size of tooth on the inferior margins of the mandibles, or its absence; shape and sculpture of the face, size of the ocelli (varying within certain limits, see remarks under *hexagona*), presence and shape of a swelling on each side of the mesosternum; presence of a carina or other process on the middle coxa in front, and of a subapical blunt tooth behind; nature of lateral carinae or tubercles on the fifth to eighth ventral segments, and armature of the pygidial segment.

The females of the genus have heretofore been all associated under the name *dubitata* Smith, excepting *euterpe* which occurs only in Florida. Rohwer has identified certain Coloradan females with *briaxus* Blake, known otherwise in the male sex. The statement has been general that *dubitata* is the female of *hexagona*.

When I received the type of *ornatipennis* from Mr. Manee, it still held, clasped in its mandibles around the neck, a female, with which it had presumably been mating. The extreme similarity of this female, evidently belonging to the very rare *ornatipennis*, with the very common eastern *dubitata*, led to the suspicion that this was in reality a composite species. A careful study of over one hundred specimens of "*dubitata*" from various regions, substantiates this inference. There are four species

each represented by a considerable number of specimens, and probably three others from the extreme south represented by a small number. The former seem to correspond sufficiently both in distribution and abundance to the four commoner eastern males, *briaxus*, *hexagona*, *rufa*, and *promethea*, to make their association justifiable, at least tentatively, and certainly preferable to the creation of new names.

There can be little query concerning the identity of the females that I here call *briaxus* with that species, and by reason of their truncate thorax and square humeral angles the individuals of this species are more readily recognized than some of the others. Like the males of *briaxus* these are the only females occurring in Canada. They occur in Colorado and are common in the North-east south to Virginia. I am led to identify *promethea* as such, by the fact that, like the male, it occurs only in South Georgia and Florida, and is common at Spring Creek, where I took many males of *promethea*. Of another species I have two females caught at Yaphank, Long Island, on the same day that males of *hexagona* were caught, and this taken with similar distribution leads me to assign this group of females to *hexagona*. There remains the fourth group, which agreeing in distribution, must be assumed to be *rufa*.¹ I am well aware that this method of associating sexes is not conclusive, but under the circumstances it seems to me better in the present case than to establish the females under new specific names.

The only character by which I have been able to separate the females is the shape of the thorax, and this can not be expressed in a key with sufficient exactness to make it probable that it can be used for the identification of specimens without a series for comparison. The structure of the pygidium varies from entirely

¹ Since drawing this conclusion it has been substantiated by the receipt from Mr. Banks of a male *rufa* pinned with one of these females, and taken together but not *in coitu*. Still later I have seen in the collection of the United States National Museum a male *briaxus* pinned with the female as above defined, from Centreville, Florida, and bearing the label "Taken in copulation, Hubbard," and also a male *promethea* stated by R. A. Cushman to have been positively taken in copulation with the female specimen with which it is pinned, at Tallulah, Louisiana. This female is a typical specimen of the form which I have above assigned to *promethea*. The females of *briaxus*, *promethea*, *rufa*, and *ornatipennis* may therefore be considered as positively established.

smooth to granular and through various stages of wrinkling to completely rugose. I can not conclude that its differences are specific; nor are those found in the carina of the petiole. In these four species this carina usually has an anterior tooth, which sometimes is reduced or wanting or modified in shape. The color is no better. Specimens with an excess of black pubescence on the abdomen are in the majority in *briaxus* including *ornativentris*, but individuals of other species approach this condition and exceed that of some specimens of *briaxus*. I am inclined to think it possible that the amount of black pubescence may to some extent be correlated with locality, as is the case with the blackness of thorax of the male. The amount of silvery pubescence is similarly variable.

Males

1. Scape with a dense brush of white pubescence beneath, at apex or along entire length. In one species with barred wings this brush is thin, but the hairs are long and white; ocelli small, the posterior pair distant from the eyes by from two and one-half to five times their transverse diameter (2)
 Scape without a brush of white pubescence, nearly nude beneath with moderate, appressed, grey, pubescence above, or with that also largely wanting; wings never barred (6)
2. Pygidium with a raised longitudinal impunctate, polished platform, strongly elevated posteriorly and terminating before the apex of the segment in the flaring arms of a prominent Y-shaped carina, best seen from an apical view, the stem of which reaches the apex of the pygidium in the median line; wings fuscous but without a transverse hyaline band (4)
 Pygidium with a low median impunctate polished ridge, terminating rather gradually before the apex, there being no carina between its apex and that of the segment; wings with a hyaline transverse band, giving the species a strikingly ornate appearance; basal segment of scape strongly compressed (3)
3. Scape not carinate, with a very dense brush of long white pubescence; clypeus with a median tubercle near its apex; eyes distant from the posterior ocelli by five times the diameter of the latter . . . **barbata** Fox
 Scape with a strongly raised carina near its apex (sometimes weak), its white pubescence sparse; clypeus without a median tubercle; eyes distant from the posterior ocelli by three times the diameter of the latter.
ornatipennis n. sp.
4. Middle coxae with a strong inner subapical tooth, pointing backwards; tubercles on mesosternum transverse, their anterior margins subtruncate and nearly vertical; fifth ventral segment and sometimes the sixth without tubercles, the sixth and seventh usually with weak tubercles and the eighth with a moderately strong, oblique, dentiform carina on each side. (5)

Middle coxae unarmed; tubercles on mesosternum oblique, without truncate anterior margin; sixth and following ventral segments on each side with strong mammiliform tubercles, the fifth also with a trace of a tubercle..... **barbigera** n. sp.

5. Dorsal abdominal segments with long, dense, rather tomentose, orange pubescence..... **grotei** Blake

Dorsal segments with much shorter and sparser, red or black, erect, pubescence, not at all tomentose..... **briaxus** Blake

6. Inferior border of mandibles with a deep emargination and large tooth near the base; ocelli small, the distance of the posterior pair from the eyes equal to from three to four and one-half times their transverse diameter..... (7)

Inferior margin of the mandibles not emarginate; ocelli usually large, the distance of the posterior pair from the eyes (except in *rufosignata*) equal to or at most two times their transverse diameter; mesosternum not tuberculate..... (11)

7. Pygidium with a low median impunctate ridge, not elevated posteriorly, but continued on the apical half of the segment by a low but sharp median carina which has no lateral arms; sixth, seventh and eighth ventral segments with mammiliform tubercles, those on the sixth minute; middle coxae without subapical teeth, but with an anterior swelling.

promethea Blake

Pygidium with a median, raised, impunctate, polished ridge, strongly elevated posteriorly, and there abruptly terminated by the spreading arms of a Y-shaped carina which extends to the apex of the segment, the arms of the Y being usually very short, in one species the ridge itself almost wanting, the Y-shaped carina alone distinct..... (8)

8. Arms of the carina on the pygidium spreading broadly, enclosing a broad ridge or elevated platform; fifth and sixth ventral segments with a papilla on each side, that on the sixth prominent, while the seventh and eighth have oblique, low, not angular nor toothed, carinae; middle coxae with a weak posterior subapical tooth, and a sharply carinate swelling on the anterior part..... **rufa** Lepeletier de Saint Fargeau

Arms of the carina on the pygidium very short, the tip of the ridge being therefore very narrow; fifth ventral segment without and sixth without or in one species with very small lateral tubercles..... (9)

9. The vertex between the anterior and posterior ocelli prominently elevated on each side, the posterior ocelli in an almost vertical position, their distance from the eyes four and one-half times their diameter; pubescence of abdomen sparse and mostly dark red, with a small quantity of fine, appressed, coppery pubescence..... **floridensis** Blake

The vertex not unusually elevated between the ocelli, the posterior pair more oblique, their distance from the eyes three and one-half times their diameter; pubescence of abdomen dense and longer, orange colored, and with much fine, appressed, golden pubescence on the apex of each segment..... (10)

10. Punctuation of the third and following dorsal segments shallow, small, and except on the sides sparse, the vestiture correspondingly sparse; minute tubercles on the sides of the sixth ventral segment; posterior ocelli separated from each other by three times the length of their transverse diameter. **nestor** Blake
- Punctuation of the third and following dorsal segments dense and not shallow, the vestiture correspondingly dense; sixth ventral segment unarmed; posterior ocelli separated by twice the length of their diameter. **oajaca** Blake
11. Pygidium with a median carina which is very strongly angularly elevated some distance before the apex; sixth ventral segment simple, seventh with a short oblique carina, eighth with a long low ridge on each side; scape of antennae not carinate. **navasota** n. sp.
- Pygidium with a Y-shaped apical carina, the two arms of the Y embracing the abrupt termination of a median, longitudinal, raised, impunctate, polished platform; scape in front bicarinate, in one species rather feebly so. (12)
12. Distance of the eyes from the posterior ocelli three times as great as the diameter of the latter, this equal to three-fifths of their distance from the front ocellus. **rufosignata** n. sp.
- Distance of the eyes from the posterior ocelli less than twice as great as the diameter of the latter, this equal to or exceeding their distance from the front ocellus. (13)
13. Distance of the eyes from the posterior ocelli equal to about one and one-half times their diameter (1.5-1.8); this about equal to their distance from the front ocellus. **hexagona** Say
- Distance of the eyes from the posterior ocelli scarcely exceeding the diameter of the latter (1.2 thereof); this equal to about one and one-half times their distance from the front ocellus. **sayi** Blake

Females

1. Head orange red. (2)
- Head black, front sometimes a little reddish; thorax with sides nearly straight, slightly concave, not much widened behind, posterior face squarely truncate. **oajaca** Blake
2. Sides of thorax very deeply emarginate, only three-fourths as wide in the middle as behind or in front, the width in front and behind subequal; posterior face truncate; last three dorsal abdominal segments red. **euterpe** Blake
- Sides of the thorax much less deeply, sometimes not, emarginate. (3)
3. Sides of the thorax not noticeably emarginate; thorax posteriorly gradually sloped; inferior carina of petiole with an anterior blunt tooth, not red at apex. **ornatipennis** n. sp.
- Sides of thorax distinctly emarginate. (4)
4. Thorax much widened and truncate posteriorly. **promethea** Blake
- Thorax little or no wider behind than in front. (5)

5. Thorax rather long with its caudal face sloping and gradually rounded into the dorsal, the humeral angles (as seen from above) rounded.

rufa Lepeletier de Saint Fargeau

Thorax long, its humeral angles broadly rounded, its posterior face truncate, but rounded above into the dorsum. **hexagona** Say.

Thorax short, rectangular, its humeral angles sharp, its posterior face squarely truncate and rather sharply separated from the dorsal.

briaxus Blake

Mutilla (Timulla) barbata Fox

1899. *Mutilla barbata* Fox, Trans. Amer. Ent. Soc., 25:212, ♂.

This species is still known only from the unique type. It is a close ally of the following. The transverse diameter of the posterior ocelli is .09 mm.; their distance from the eyes .43 mm., from each other .38 mm., from the front ocellus .21 mm.

Habitat.—Missouri.

Mutilla (Timulla) ornatipennis n. sp.

♂. Orange rufous, the second dorsal segment medially xanthine orange, apical segments auburn-black, antennae black, the tip of scape and the pedicel pale; legs black; front and dorsum with sparse, short, erect, red hairs; propodeum with sparse, erect, short, white hairs, under side of scape, base of mandibles, sternal parts and under surface of coxae and femora with mostly rather dense, long, white pubescence; head with silky, appressed, red pubescence; dorsum with short, depressed, red pubescence; second and third dorsal segments with very sparse and short, appressed, white hairs, along the apex with dense appressed, bristly, red pubescence; following three segments with similar white pubescence, the seventh with depressed, sparse, white pubescence; wings ornate, fuscous, a transverse, broad, hyaline band in the region of the stigma, the cell M except at apex, and the extreme apical margin also hyaline, the darkest fuscous is at the apex of the cells $2d\ R_1 + R_2$ and R_4 . Length 11 to 17 mm. (Type 17 mm.)

Vertex and front rather shallowly punctured, the punctures separated; diameter of the posterior ocelli .17 mm., their distance from the eyes .58 mm., from each other .42 mm., from the front ocellus .28 mm.; platform on the front at base of the antennae with only feeble bounding carinae; face below the antennae raised to form a rounded tubercle, bearing a tuft of white hairs, the clypeus below strongly concave, impunctate, and polished clear to the bases of the mandibles, without a median tubercle, the margin subtruncate; mandibles with a very deep external notch and tooth on the inferior border. Anterior margin of the scape with a carina inflated beyond the middle, forming a rounded tooth; first segment of the flagellum greatly compressed, approximately equal to the second.

Pronotum weakly, but closely punctured, its side pieces obsoletely; these each with an inferior, vertical, anterior carina; mesonotum and scutellum with close round punctures, the scutellum convex; mesopleura each with a shallow oblique fossa interrupted near the posterior borders; mesosternum on each

side with a weak round tubercle; the inner surface of the mesocoxae with a weak anterior carina and a small subapical tubercle; propodeum reticulate, with a median basal irregular channel.

Petiole with a carina beneath, not incised nor toothed, truncate posteriorly; second ventral segment posteriorly with a transverse raised ridge; sixth ventral segment with a small papilla on each side; seventh and eighth each with an oblique carina, raised and subtruncate posteriorly; second dorsal segment impunctate medially; pygidium coarsely punctured, truncate, with a median impunctate ridge which terminates some distance before the apex of the segment.

The carina on the scape is less elevated in one of the paratypes.

♀. Mahogany red, abdomen from third segment to apex, antennae, tibiae and tarsi black; each segment of the abdomen with an apical band of white pubescence, that on the third interrupted medially, on the second with a triangular median elongation; other pubescence small and sparse, the sides and ventral parts with a silvery sheen.

Type material.—Holotype, ♂, and allotype, ♀: Southern Pines, North Carolina, August 12, 1907, (A. H. Manee), [Cornell University, Nos. 111.1, 111.2]. Paratopotype ♂; Sept. 1, 1911, (A. H. Manee), [Nathan Banks]; paratype, 1 ♂, Spring Creek, Decatur County, Georgia, June 1 to 23, 1911, (the author); paratypes, 2 ♂, Falls Church, Virginia, 16 Sept., at honey dew on tulip tree (N. Banks), [N. Banks and Cornell University].

Additional female: Billy's Island, Okefenokee Swamp, Georgia, June 1912, (Cornell University Expedition).

This species evidently replaces *barbata* in the east, and is very closely related to that species. The much sparser brush of hairs and carina on the scape and absence of a clypeal tubercle will distinguish it. It approaches no other species very closely in the male sex.

The allotype of this species was pinned below the holotype, which still held her with jaws clasped around her neck.

Mutilla (Timulla) barbiger n. sp.

♂. Black and red; head black, its upper half mahogany red; antennae black, the tip of scape and the pedicel red; thorax black, the pronotum and mesonotum mahogany red; legs black; petiole black; rest of abdomen Sanford's brown; rather thickly clothed with short, erect, black pubescence, which is dense along the apex of the second and third dorsal segments, not mixed with short appressed pubescence; wings dark brown. Length 19 mm.

Head closely, shallowly punctured; transverse diameter of the posterior ocelli .21 mm., their distance from the eyes .75 mm., from each other .58 mm., from the front ocellus .36 mm.; inferior margin of the mandibles with a rather small tooth, not deeply emarginate; scape lined beneath with silvery white

pubescence, which is lengthened apically into a brush, not carinate; the first segment of the flagellum not strongly compressed, equal to the second.

Side pieces of pronotum, each with an inferior carina near its anterior border; scutellum strongly convex and coarsely closely punctured; mesopleura with an oblique fossa, interrupted before the hind margin; mesosternum on each side with an oblique, not carinate tubercle, inner surface of mesocoxae with a swelling, smooth in front, their posterior surface without a subapical tooth.

Carina beneath the petiole rather prominent, thick, deeply notched in the middle; middle of the second ventral near the base slightly prominent but rounded, not carinate; fifth ventral on each side with a trace of a tubercle, sixth with a mammiliform tubercle, seventh and eighth with oblique carinae strongly elevated and subtruncate posteriorly; pygidial segment at apex with a Y-shaped carina, the two arms of which are broadly spreading and enclose the end of a raised, impunctate, polished, median longitudinal platform.

Type.—Dallas, Texas. Collection of the American Entomological Society.

Mutilla (Timulla) grotei Blake

1871. *Mutilla grotei* Blake, Trans. Amer. Ent. Soc., 3:228, ♂.

Transverse diameter of the posterior ocelli, .17 mm., their distance from the eyes .58 mm., from each other .51 mm., from the front ocellus .30 mm.

Habitat.—Colorado and, according to Melander, Texas.

Mutilla (Timulla) briaxus Blake

1871. *Mutilla briaxus* Blake, Trans. Amer. Ent. Soc., 3:227, ♂.

1887. *Mutilla canadensis* Provancher, Add. et Corrections au vol. ii de la Fauna Entomologique du Canada, Traitant des hyménoptères, p. 250, ♂.

1897. *Mutilla secunda* Dalle Torre, Catalogus hymenopterorum, 8:84, ♂.

1899. *Mutilla hexagona* Fox, (pars), Trans. Amer. Ent. Soc., 25:270, ♂.

1909. *Mutilla (Timulla) briaxus* Rohwer, Trans. Amer. Ent. Soc., 35:132, ♂, ♀.

♂. Diameter of posterior ocelli .23 mm., their distance from the eyes .61 mm., from each other .51 mm., from the front ocellus .21 mm.; front and clypeus deeply concave, highly polished, laterally striolate almost to the bases of the mandibles; these with a deep external notch and strong tooth. Scape with a weak carina obscured by vestiture.

Not only the brush on the apex of the scape, but the armature of the apical segments, the structure of the clypeus and other

characters separate this from *hexagona* and *rufa*. To *grotei* it is much more closely allied.

This is the most northern species of the group, and one of our most northern Mutillidae. In common with many species of other families, its known range bridges the gap between the northern Rocky Mountains and our eastern mountain regions by way of Canada. The western specimens usually have somewhat more greyish pubescence on the thorax than those from the East. All of the specimens before me have the head and thorax black except one from Florida, and that individual is the only record from south of Falls Church, Virginia.

The identity of *Mutilla canadensis* of Provancher with *briaxus* is made clear from his description. Not only is it the only species known from Canada, but Provancher refers to the white brush at the apex of the scape, thereby leaving no doubt of the insect to which he had reference. The name *secunda* was proposed by Dalle Torre to replace *canadensis* of Provancher.

There is little doubt of the identity of the males referred to this species by Rohwer. That the female which he also describes belongs to it, seems likewise probable.

Habitat.—Males. CANADA: [Coll. Amer. Ent. Soc.]; Cap Rouge, Quebec, (*canadensis* Provancher). NEW HAMPSHIRE: Claremont, 10 July, 1911, (G. P. Engelhardt). NEW YORK: Queens, Long Island, 23 July, [Brooklyn Museum]. PENNSYLVANIA: [Amer. Ent. Soc.]. NEW JERSEY: Monmouth County, 1 June, 1891 and Gloucester, Camden County, 15 July [Amer. Ent. Soc.]. DELAWARE: [Amer. Ent. Soc.]. VIRGINIA: Falls Church, 5, 19, 22, 30 July and 2 August, 5 ♂ (N. Banks), [N. Banks]. FLORIDA: [Amer. Ent. Soc.].

BRITISH COLUMBIA: Osayoos, 26 July, [Amer. Ent. Soc.]. MONTANA: 3 specimens [Amer. Ent. Soc.]. COLORADO: 3 specimens, [Amer. Ent. Soc.]; Boulder, May 1908, (recorded by S. A. Rohwer).

Females. CANADA: 2 specimens [Amer. Ent. Soc.]; Ridgeway, Ontario, 13 August 1884, [Amer. Ent. Soc.]. NEW YORK: New Russia, Essex County, 18 August 1912, (the author); Crown Point, August; Roslyn, Long Island; Yaphank, Long Island, 10 July, 1910, (G. P. Engelhardt); Amagansett, 10 August, 1911, (G. P. Engelhardt); Sea Cliff, Long Island (N. Banks); East Hampton, Long Island, 26 September, 1910, (G. P. Engelhardt); Cold Spring Harbor, 9 September, 1911, (G. P. Engelhardt). NEW JERSEY: Westville, 30 August, 2 ♀ (the author). MARYLAND: Chestertown, 2 August, 1901 (E. G. Vanatta). VIRGINIA: Glencarlyn, 26 July, (N. Banks); Falls Church 4, 6, 7 August, 4 ♀, (N. Banks). GEORGIA: Atlanta, 6 July, 1909, (the author). FLORIDA: 1 specimen, [Amer. Ent. Soc.]. OHIO: Wanseon, 5 August, 1896. NEBRASKA: Hat Creek, August; West Point, 24 June. COLORADO: 5, [Amer. Ent. Soc.].

Type.—Virginia. Collection of the American Entomological Society.

Mutilla (Timulla) promethea Blake

?1855. *Mutilla dubitata* Smith, Cat. Hymen. in Brit. Mus., 3: 60, ♀.

1871. *Mutilla promethea* Blake, Trans. Amer. Ent. Soc., 3: 229, ♂.

♂. Diameter of posterior ocelli .19 mm., their distance from the eyes .72 mm., from each other .64 mm., from the front ocellus .36 mm.; face and clypeus very deeply concave and highly polished, impunctate, the polished area reaching half way to the base of the mandibles, surmounted above by a dense tuft of hair, a very few hairs at apex. Scape rather strongly bicarinate beneath, with little pubescence.

Mesosternum with strong transverse tubercles, ridged on their summit and with nearly vertical anterior faces; middle coxae with a weak anterior tubercle, without posterior subapical tooth.

Judging from the carina on the pygidium *promethea* would seem to be closer to *barbata* and *ornatipennis* than to other species.

Habitat.—Males. NORTH CAROLINA: Southern Pines, 24 September, 1907, (A. H. Manee). GEORGIA: St. Simon's Island; Billy's Island, Okefenokee Swamp, June, 1912, 3 ♂, (Cornell University Expedition); Bainbridge and Spring Creek, Decatur County, 30 May, 1 June, 16–29 June, 5 ♂, (the author). FLORIDA: South Bay, Lake Okeechobee, 2 ♂ (Wm. T. Davis); Sanford, 27 April, 1908, (E. P. VanDuzee), [Amer. Mus. Nat. Hist.]. LOUISIANA: 2 specimens, [Amer. Ent. Soc.].

Females. GEORGIA: Spring Creek, Decatur County, 16 to 29 July, 1912, 9 ♀, (Cornell University Expedition); Bainbridge, 30 July, 1912, (C. U. Expedition); Thomasville, 21 May, 1915, 1 ♀ (C. S. Spooner); 2 specimens, [Amer. Ent. Soc.]. FLORIDA: Jacksonville, 21 April; Enterprise, 18 April; Gulfport, May. LOUISIANA: 1 specimen, [Amer. Ent. Soc.].

So far as known, this species is confined to the Austroriparian Zone.

Type.—Male from Louisiana in the collection of the American Entomological Society. Allotype, ♀, from Thomasville, Ga., in the collection of Cornell University, No. 110.1.

Mutilla (Timulla) floridensis Blake

1879. *Mutilla floridensis* Blake, Trans. Amer. Ent. Soc., 7: 249, ♂.

♂. Diameter of posterior ocelli .15 mm., their distance from the eyes .66 mm., from each other .43 mm., from the front ocellus .21 mm.

Habitat.—GEORGIA: 1 ♂, [Amer. Ent. Soc.]; St. Simon's Island, 9 June, 1911, (W. V. Reed). FLORIDA: Enterprise, 15 May, [Amer. Ent. Soc.]; Enterprise, 30 March to 10 May, [Amer. Mus. Nat. Hist.]; Biscayne Bay, (Mrs. A. T. Slosson), [Amer. Ent. Soc.].

Mutilla (Timulla) euterpe Blake

1879. *Mutilla euterpe* Blake, Trans. Amer. Ent. Soc., 7:249, ♀.

As suggested by Fox, this species is very likely the female of *floridensis*. So far it is known only from the unique type. The deeply contracted thorax clearly distinguishes it from the females of other species.

Type: Enterprise, Florida, May. Collection of American Entomological Society.

Mutilla (Timulla) rufa Lepeletier

1845. *Mutilla rufa*, Lepeletier de St. Fargeau, Hist. nat. ins., Hymen., 3: 631, ♂.

1899. *Mutilla hexagona* Fox, (pars), Trans. Amer. Ent. Soc., 25:270, ♂.

♂. Diameter of posterior ocelli .21 mm., their distance from the eyes .62 mm., from each other .43 mm., from the front ocellus .21 mm.; face and clypeus convex and polished, laterally roughened; emargination on inferior border of mandibles not deep, the tooth rather small, blunt. Scape apically weakly bicarinate.

Mesosternum with an inconspicuous somewhat oblique tubercle, not ridged on its summit.

♀. Sanford's brown: antennae except scape, legs except femora beneath and coxae, and dorsal segments beyond the second black; the scape dark red; each abdominal segment with an apical silvery band, that of the third interrupted and that of the second triangularly produced in the middle; other pubescence scanty, the second dorsal with an inconspicuous appressed black pubescence; pleura and sternal parts with a silvery sheen. Under side of petiole with an anterior acute tooth; pygidium rugulose.

The color characters are subject to variation. I may be wrong in considering the females of *rufa* and *hexagona* as here identified distinct species, and would not do so were it not for the considerations already stated. The males are very distinct.

There is very little likelihood, as Fox points out, that the species identified by Blake and tentatively accepted by Fox as *rufa* is really that species. It is represented in the collection of

the American Entomological Society by a single female from an unknown locality. The hirsute appearance of the specimen is similar to that of species inhabiting Texas and Mexico, but quite unlike any known from the Eastern United States. As *rufa* was described from Philadelphia, it seems much better to identify it with a form known to occur here. A specimen of the present species from Ocean County, New Jersey, in the collection of the American Entomological Society, agrees very well with Brullé's description. From a study of his other descriptions it is apparent that in speaking of the head, thorax and abdomen as "villosum" he means to imply not tomentose, but such a condition as actually exists in *rufa* as here identified. It is possibly this character that lead to the previous identification of the species.

Habitat.—Males. NEW YORK: Long Island, 5 September, 1907, (G. P. Engelhardt). NEW JERSEY: Ocean County, [Amer. Ent. Soc.]; Lakehurst, [Brooklyn Mus.]. MARYLAND: Chestertown, 12 August, 1901, (E. G. Vanatta). VIRGINIA: Falls Church, 2, 10, 15, 23, 30 August, 9, 12, and 20 September, 13 ♂, (N. Banks), [N. Banks]. NORTH CAROLINA: Smith's Island, 3 August. GEORGIA: Austell, 27 August, 1910, (the author); St. Simon's Island, 1 and 7 June, 1911, (W. V. Reed); Spring Creek, Decatur County, 7 to 23 June, 1911, 2 ♂, (the author). FLORIDA: [Amer. Ent. Soc.].

Females. NEW YORK: Sea Cliff, Long Island, 2 ♀, (N. Banks). NEW JERSEY: Lakehurst, 23 April, 1905, (G. P. Engelhardt). MARYLAND: Chesapeake Beach, 18 September, (N. Banks). VIRGINIA: Falls Church, 4, 14 July, 2, 3, 7, 11, 30 August, 13, 23 September, (N. Banks); Chain Bridge, 21 May (N. Banks). NORTH CAROLINA: Southern Pines, 1 April, 1908, (A. H. Manee). GEORGIA: Tallulah Falls, 19 to 25 June, 1909, (the author); Spring Creek, 16 to 29 June, 1912, (Cornell Univ. Expedition). FLORIDA: Lake Worth, (Mrs. A. T. Slosson).

***Mutilla (Timulla) nestor* Fox**

1899. *Mutilla nestor* Fox, Trans. Amer. Ent. Soc., 25:271, ♂.

♂. Transverse diameter of the hind ocelli .13 mm., their distance from the eyes .43 mm., from each other .38 mm., from the front ocelli .21 mm.

Habitat.—Texas. Recorded by Mr. Melander as common during June 1900 at Galveston, and as occurring at Fedor. I have seen only the type.

Mutilla (Timulla) oajaca Blake

1871. *Mutilla oajaca* Blake, Trans. Amer. Ent. Soc., 3:228, fig., ♂, ♀.

Diameter of the posterior ocelli .13 mm., their distance from the eyes .58 mm., from each other .53 mm., from the front ocellus .28 mm.

Habitat.—LOUISIANA: [Amer. Ent. Soc.]. TEXAS: [Amer. Ent. Soc.]. MEXICO: [Amer. Ent. Soc.].

Type.—Mexico, in the Collection of the American Entomological Society.

Mutilla (Timulla) rufosignata n. sp.

♂. Black, pronotum and mesonotum claret-brown, the abdomen except the petiole and apex of the second and third segments burnt sienna; clothed with erect, rather short, black pubescence, and also short, woolly, dirty-white pubescence, the sternal parts with whitish pubescence, neither long nor dense; disc of second dorsal segment with fine pale hairs, apex with moderately dense, black, bristly hairs, as also of the third, fourth and fifth, where they are sparser; sixth and seventh with sparse, erect, fine, white hairs, the former mixed with shorter, coarser, reddish hairs; wings deeply infuscated. Length 13 mm.; paratype 16 mm.

Head coarsely punctate; the diameter of the posterior ocelli .15 mm.; their distance from the eyes .49 mm., from each other .62 mm., from the front ocellus .28 mm.; clypeus with a nearly flat, semicircular, smooth and polished area, the face between this and the base of the mandibles punctate and hirsute; inferior border of the mandibles entire. Scape slightly pubescent, bicarinate in front.

Side pieces of pronotum with a weak vertical carina in front; scutellum convex and rugosely punctate; mesopleura with a deep oblique fossa, interrupted near the posterior border; mesosternum coarsely punctate, without tubercles, but with a distinct anterior face which is polished and almost impunctate; mesocoxae with rudimentary anterior tubercle and subapical tooth.

Second ventral segment not ridged; fifth and sixth unarmed, seventh with rudimentary tubercles and eighth with a weak oblique long ridge of chitin, scarcely raised at all; polished ridge on pygidium short and rather narrow, the arm of the Y-shaped carina not spreading very widely.

This species is quite close in structure to both *hexagona* and *sayi*.

Type material.—Holotype: Everglade, Florida, April 11, 1912, (Wm. T. Davis), [Cornell University, No. 112.1]. Paratype: "Florida," [American Entomological Society].

Mutilla (Timulla) navasota n. sp.

♂. Black, the abdomen with its pubescence appearing orange rufous, the ground color a trifle more red; head and posterior part of dorsum with erect black hairs; head and dorsum in front of the tegulae with felted, cartridge-buff pubescence, abdomen dorsally thickly covered with erect mars-orange pubescence, concealing shorter appressed, cadmium-orange pubescence; wings dark violaceous. Length 13 mm.

Head coarsely, closely punctured; ocelli large, diameter of the posterior pair .32 mm., their distance from the eyes .36 mm., from each other .66 mm., from the front ocellus .26 mm.; face strongly elevated below the antennae; it and the clypeus with a strong, concave, highly polished, impunctate, V-shaped area, between which and the base of the mandibles the face is aciculate; inferior margin of the mandibles entire.

Mesopleura with a deep oblique fossa, interrupted near the posterior margin; mesosternum with a weak transverse callous spot, its anterior surface sloping, punctate; under surface of the middle coxae with a callous spot, without sub-apical tubercle, under surface of posterior coxae with a rather long carina. Propodeum coarsely, rather shallowly reticulated, with a short median channel.

Second ventral segment not ridged; fifth and sixth unarmed; seventh with rudimentary tubercles; eighth with a very feeble oblique ridge; pygidium without median impunctate ridge, but toward the apex with a strongly elevated keel, the dorsal and caudal lines of which form a right angle.

Holotype: Brazos County, Texas. Collection of Mr. Nathan Banks.

Mutilla (Timulla) hexagona Say

1836. *Mutilla hexagona* Say, Bost. Journ. Nat. Hist., 1:295, ♂.

1899. *Mutilla hexagona* Fox (pars), Trans. Amer. Ent. Soc., 25:270, ♂.

1903. *Mutilla sayi* var. *hollensis* Melander, Trans. Amer. Ent. Soc., 29:324.

♂. The ocellar measurements of an average of 10 specimens are: diameter posterior ocelli .22 mm., their distance from the eyes .37 mm., from the front ocellus .21 mm. There is a trifling variation in the individuals of this species, the distance between eyes and ocelli exceeding the diameter of the latter by an extreme range of from 1.5 to 1.77 times.

♀. Claret brown; legs except femora beneath, antennae, petiole and pygidium black; apex of each abdominal segment except the first ventral with a band of silvery pubescence, interrupted medially on the third dorsal and triangularly produced in the middle on the second dorsal; dorsal segments otherwise mostly covered with short black pubescence, giving way to brown, red, and on the second, silvery pubescence on the sides; other pubescence sparse; head and front of dorsum with erect black hairs; sides of thorax and venter with a silvery sheen.

Petiole with an inferior, anterior, truncate, process; pygidium with oblique wrinkles, converging caudad.

The coloration of the female is not constant.

Taking all things into consideration this form seems to be the most suitable to identify as Say's species. In all respects except the size of their ocelli, the species *sayi* Blake and *rufosignata* appear to be alike.

Habitat.—Males. NEW YORK: Yaphank, Long Island, 22 September, 1911 and 11 October, 1913, (G. P. Engelhardt). VIRGINIA: Falls Church, 7 and 12 August, (N. Banks). ILLINOIS: Lake Forest, 22 August, 1906, (J. G. Needham), [Cornell Univ.]. INDIANA and MISSOURI (Original records by Say). TEXAS: 2 specimens, [Amer. Ent. Soc.]. COLORADO: 1 specimen, [Amer. Ent. Soc.]. MONTANA: 1 specimen, [Amer. Ent. Soc.].

Females. NEW YORK: Yaphank, Long Island, 22 and 24 September, 1911, (G. P. Engelhardt); Central Park, 17 April, 1912, (G. P. Engelhardt). NEW JERSEY. VIRGINIA: Falls Church, 18 April, 17 May, 2, 4, 11, 27 August, 3, 24 September; Great Falls, 28 June, 12 September; Glencarlyn, 26 September, (N. Banks), [N. Banks]. GEORGIA: 1 specimen, [Amer. Ent. Soc.].

Allotype, ♀. Yaphank, Long Island, [Cornell University, No. 113.2].

Mutilla (Timulla) sayi Blake

1871. *Mutilla sayi* Blake, Trans. Amer. Ent. Soc., 3:29, ♂.

♂. Transverse diameter of the posterior ocelli .32 mm., their distance from the eyes .37 mm., from each other .58 mm., from the front ocellus .22 mm.

This species agrees in all structural characteristics, so far as I have observed, except the size of the ocelli with *hexagona*. The records given by Fox "Montana" and "Colorado" are based on specimens of *hexagona*. It would be no cause for surprise if future series would reveal the identity of the two.

Habitat.—MISSOURI: Columbia, 8 ♂, 13, 21, 22, 29 July, 2 September, 1905, [Univ. Mo., Cornell Univ.]. TEXAS: 3 ♂, [Amer. Ent. Soc.].